

Peak Pertussis Season Approaching

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Introduction and Background

Pertussis is the most frequently reported vaccine-preventable disease among children less than five years of age, but increased reporting of cases in adolescents and adults has been observed nationally and in Indiana during the 1990s. Although pertussis has no distinct seasonal pattern (cases are reported in every month of the year in the U.S.), incidence does increase during the summer and early fall months. This report will summarize Indiana data on incidence of pertussis by age and seasonality and provide recommendations on pertussis prevention and control.

In 2002, 183 cases in Indiana met the confirmed or probable case definition for pertussis, the second highest number of cases reported in any year since 1985 (there were 185 cases reported in 1998). A confirmed case of pertussis is defined as:

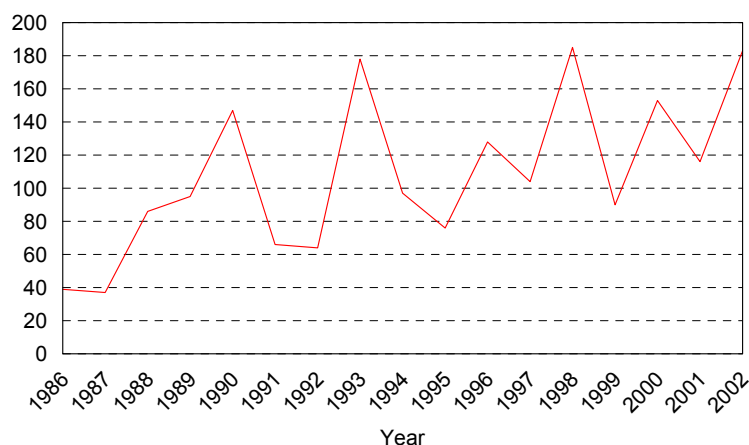
- 1) a person with an acute cough illness of any duration who is culture positive, or
- 2) a case that meets the probable case definition and is confirmed by PCR, or
- 3) a case that meets the probable case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR.

The **probable** case definition is a person with a cough illness lasting at least two weeks with one of the following: paroxysms of coughing, inspiratory whoop, or post-tussive vomiting. A probable case is not culture or PCR confirmed or is not linked to a laboratory confirmed case.

Figure 1 shows the general increase in pertussis incidence in Indiana as well as the typical cyclical pattern of pertussis since 1986. Nationally as well as in Indiana, reported pertussis incidence has increased since the 1980s. The increase has been primarily in adolescent and adult cases, but reasons for the rise are not completely clear. It has been suggested that improvements in diagnosis and reporting are felt to have contributed to the increase in the older age groups.

Figure 1.

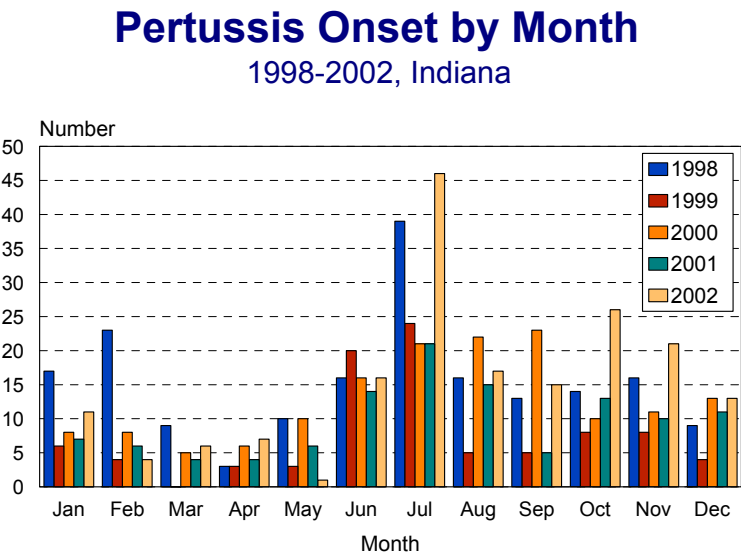
Pertussis Incidence Indiana, 1986-2002



Seasonality

Pertussis can occur during any month of the year. From 1998-2002, there has been at least one case of pertussis reported monthly in Indiana except March 1999. July had the highest incidence in four of the five years. In addition, analysis by month over the five year period shows that 20.8% (151/727) of all cases were reported in July. During the past five years, pertussis onset tends to be highest during the June-September period, representing 50.8% of the cases (see Figure 2).

Figure 2.



Age-Related Pertussis

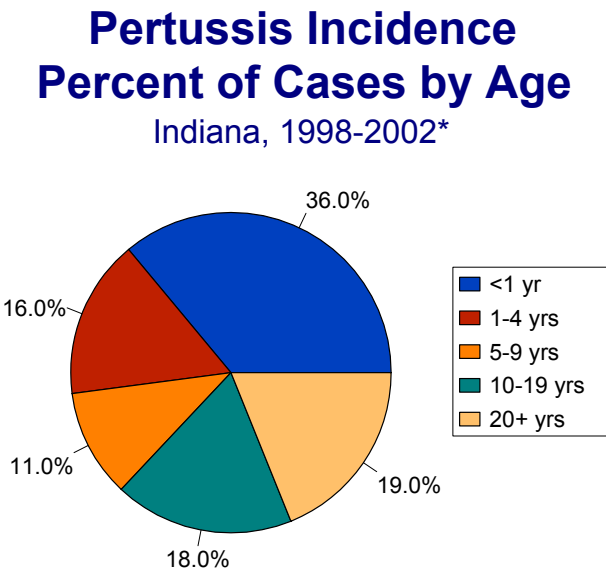
Pertussis incidence has increased since the 1980s with adolescents and adults accounting for a major portion of the rise in cases. Table 1 shows the general increase by decade and Figure 3 shows the breakdown of cases by age group from 1998-2002. The highest incidence occurs among those less than one year of age, ranging from 27- 43% of cases during the last five years. As noted earlier and as seen in Figure 4, an increase in the percentage of cases attributable to persons 10 years old and older has occurred. The spike in cases in 2002 among the 1-4 year age group was the result of an outbreak in LaGrange County among a poorly vaccinated population (see *Indiana Epidemiology Newsletter*, September, 2002). Figure 5 shows the total number of cases compared to the cases that are 10 years and older from 1991-2002. A slight increase in the number of cases 10 years and older is evident from 1991-1999, and then a dramatic increase is indicated from 2000 to 2002.

Table 1.

Pertussis Incidence Selected Decades, Indiana

Decade	Average Number Cases per Year
1950s	1077
1960	273
1970s	88
1980s	108
1990s	112
2000-02	151

Figure 3.



*Percent determined by total cases for five-year period

Figure 4.

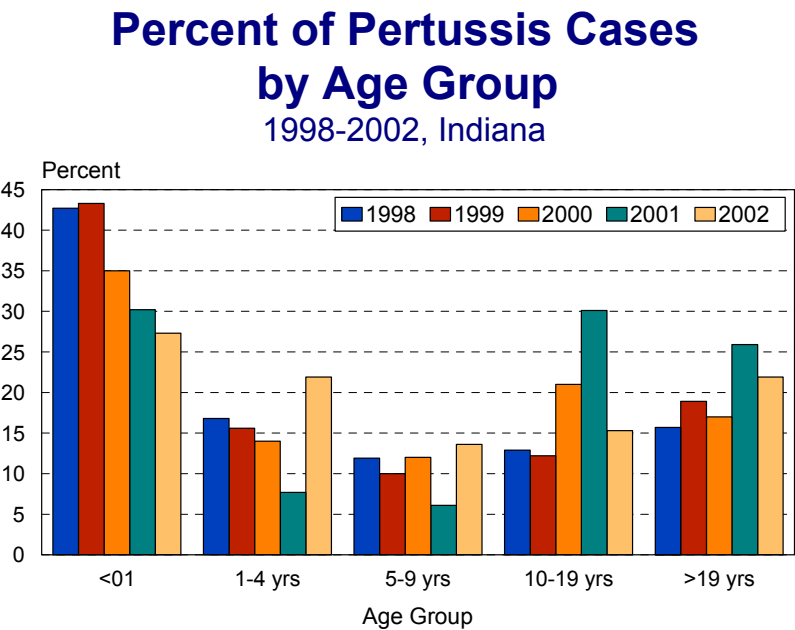
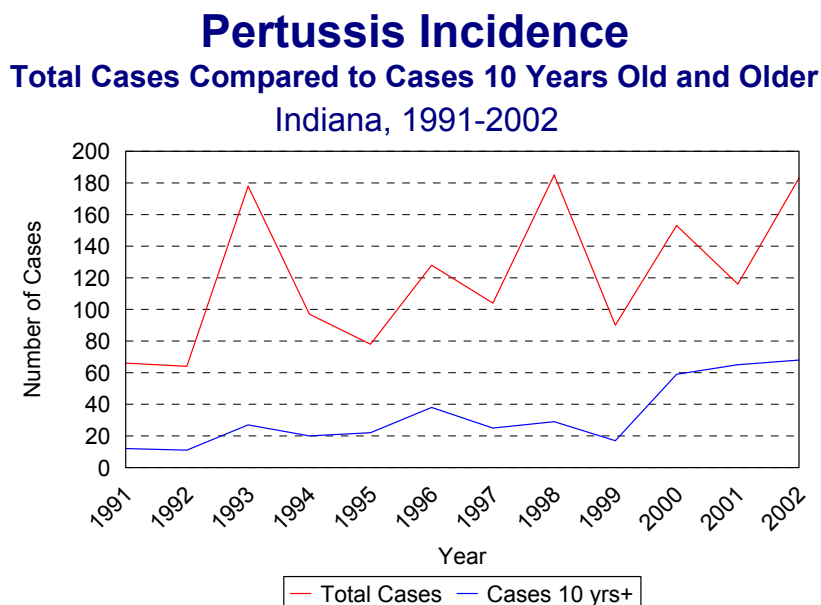


Figure 5.



Immunity to pertussis begins to wane 5-10 years following the last vaccine dose (appropriately given at 4-6 years of age), and therefore pertussis in adolescents and adults can occur even though they were fully vaccinated as children. Therefore, older children and adults often serve as the source of infection for infants, who are at risk for the most severe consequences of infection. The disease may be milder in older persons, so often the infected adult or adolescent is not identified until the infant has been hospitalized and/or diagnosed. Many other adults and adolescents most likely go undiagnosed and serve as sources of infection in the family and community. A recent prospective study (1) conducted among adolescents and adults (10-49 years of age) in a managed care organization in Minnesota reported that "...the estimated annual incidence of pertussis was 507 cases per 100,000 person-years". The study published in the May 1, 2001 issue of *The Journal of Infectious Diseases* concluded that *Bordetella pertussis* maybe a more common cause of cough illness among adolescents and adults than was recognized previously. The study further suggests that a booster dose of acellular pertussis vaccine at entry to middle school may be an effective strategy to prevent pertussis among U.S. adolescents.

The ISDH offers the following recommendations for prevention and control of pertussis:

- Insure all children eligible for pertussis vaccination are up-to-date with DTaP vaccine.
- Consider the diagnosis of pertussis in acute cough illness, regardless of the age of the patient, especially if the cough is associated with post-tussive vomiting and or gagging or if the cough persists for two weeks or longer.
- Report any suspected case of pertussis to your local or state health department immediately, so that control measures can be implemented. If pertussis is strongly suspected you should not wait for laboratory results before reporting.
- Both culture and DFA testing should be performed on all suspected cases and symptomatic contacts of cases prior to the administration of antibiotics. (See side bar related to diagnostic testing.)

Additional, more specific control measures can be obtained by calling Wayne Staggs, epidemiologist, Indiana State Department of Health at 317-233-7112 or email wstaggs@isdh.state.in.us.

References

- (1) Strebel, P, Nordin J, et al. Population-based incidence of pertussis among adolescents and adults, Minnesota, 1995-1996. J Infect Dis 2001;183:1353-1359.
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Diagnostic Testing of Suspect Cases

The organism is most easily recovered from nasopharyngeal mucus in the catarrhal or early paroxysmal stages, and is rarely recovered after the fourth week of illness. It is recommended that both culture and DFA be performed. False positive and false negative DFA results may occur. A positive culture is diagnostic, whereas false-negative cultures are common in patients receiving antibiotics. Because of difficulties with laboratory testing, clinicians often must make the diagnosis on the basis of clinical findings such as inspiratory whoop, post-tussive emesis and lymphocytosis. All symptomatic contacts to cases should be cultured prior to receiving antibiotic treatment, as well as all patients with an unexplained, sleep-disturbing cough. Special attention should be paid to infants, as well as adolescents and adults with mild illness that could represent pertussis. There is no charge for pertussis testing performed by the ISDH Laboratory. Pertussis test kit 2A may be obtained by writing or calling:

**Container Section - Rm. 13 G
Medical Science Building, IUPUI Campus
635 North Barnhill Drive
Indianapolis, Indiana 46207-7202
Telephone: (317) 233-8104**

Directions for submitting specimens are enclosed in the pertussis test kit. For best results, pertussis specimens should be received in the ISDH Laboratory within 24 hours of collection (an overnight express is the preferred shipping method). For additional help with specimen handling and shipment or test result interpretation, call the Special Reference Bacteriology Laboratory at 317/233-8040.

Laboratories are encouraged to submit pertussis cultures to the ISDH Special Reference Bacteriology Laboratory.. The State Laboratory, in conjunction with the CDC Laboratories, can conduct antibiotic resistance testing and genotyping of pertussis isolates. This information would add to the public health implications and epidemiological understanding of the organism. Please call the Special Reference Bacteriology Laboratory at 317-233-8040 for questions about shipping pertussis cultures to the State Laboratory.